National Institute of Environmental Health Sciences

The implications of climate policy for the impacts of climate change on global water resources

Author(s): Arnell NW, van Vuuren DP, Isaac M
Year: 2011
Journal: Global Environmental Change : Human and Policy Dimensions. 21 (2): 592-603

Abstract:

This paper assesses the implications of climate policy for exposure to water resources stresses. It compares a Reference scenario which leads to an increase in global mean temperature of 4 °C by the end of the 21st century with a Mitigation scenario which stabilises greenhouse gas concentrations at around 450 ppm CO2e and leads to a 2 °C increase in 2100. Associated changes in river runoff are simulated using a global hydrological model, for four spatial patterns of change in temperature and rainfall. There is a considerable difference in hydrological change between these four patterns, but the percentages of change avoided at the global scale are relatively robust. By the 2050s, the Mitigation scenario typically avoids between 16 and 30% of the change in runoff under the Reference scenario, and by 2100 it avoids between 43 and 65%. Two different measures of exposure to water resources stress are calculated, based on resources per capita and the ratio of withdrawals to resources. Using the first measure, the Mitigation scenario avoids 8–17% of the impact in 2050 and 20–31% in 2100; with the second measure, the avoided impacts are 5–21% and 15–47% respectively. However, at the same time, the Mitigation scenario also reduces the positive impacts of climate change on water scarcity in other areas. The absolute numbers and locations of people affected by climate change and climate policy vary considerably between the four climate model patterns.

Source: http://dx.doi.org/10.1016/j.gloenvcha.2011.01.015

Resource Description

Communication:

resource focus on research or methods on how to communicate or frame issues on climate change; surveys of attitudes, knowledge, beliefs about climate change

A focus of content

Communication Audience:

audience to whom the resource is directed

Policymaker

Exposure :

weather or climate related pathway by which climate change affects health

Food/Water Security

Geographic Feature: ☑

resource focuses on specific type of geography

Freshwater

Geographic Location: ☑

resource focuses on specific location

Global or Unspecified

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

Intervention: ☑

strategy to prepare for or reduce the impact of climate change on health

A focus of content

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Adaptation, Mitigation

Model/Methodology: ☑

type of model used or methodology development is a focus of resource

Exposure Change Prediction

Resource Type: ☑

format or standard characteristic of resource

Policy/Opinion, Research Article

Timescale: ☑

time period studied

Long-Term (>50 years)

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content